TETRA TECH

February 20, 2020

Mr. Manuel Schmaedick
EPA On-Scene Coordinator
U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

Subject: Quality Assurance Project Plan for Martha Rose Chemical Removal Site Evaluation
Holden, Johnson County, Missouri
U.S. EPA Region 7, START 5, Contract No. 68HE0719D0001, Task Order No. 20F0061
Task Monitor: Manuel Schmaedick, EPA On-Scene Coordinator (OSC)

Dear Mr. Schmaedick:

Tetra Tech, Inc. (Tetra Tech) is submitting this Quality Assurance Project Plan (QAPP) for the Martha Rose Chemical site in Holden, Missouri. If you have any questions or comments, please contact the Project Manager at (816) 412-1772.

Sincerely,

(b) (4)

START Project Manager

(b) (4)

START Program Manager

Enclosures

X903020F0061.000

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QUALITY ASSURANCE PROJECT PLAN
REMOVAL SITE EVALUATION

MARTHA ROSE CHEMICAL SITE
HOLDEN, JOHNSON COUNTY, MISSOURI

Superfund Technical Assessment and Response Team (START) 5 Contract
Contract No. 68HE0719D0001, Task Order 20F0061

Prepared For:

U.S. Environmental Protection Agency
Region 7
Superfund Division
11201 Renner Boulevard
Lenexa, Kansas 66219

February 20, 2020

Prepared By:

Tetra Tech, Inc.
415 Oak Street
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APPENDICES

Region 7 Superfund Program
Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2017)
for the Martha Rose Chemical Site

Project Information:

Site Name: Martha Rose Chemical		**Location:** Holden	**State:** MO
U.S. Environmental Protection Agency (EPA) Project Manager: Manuel Schmaedick		**Superfund Technical Assessment and Response Team (START) Project Manager:** John Simpson	
Approved By:	(b) (4)	**Prepared For:** EPA Region 7 Superfund Division	
Title: START Project Manager	**Date:** 02/20/2020		
Approved By:	(b) (4)		
Title: START Program Manager	**Date:** 02/20/2020		
Approved By:	SIGNED FOR KATHY HOMER	**Prepared By:** (b) (4)	
Title: START Quality Assurance (QA) Manager	**Date:** 02/20/2020	**Date:** February 2020	
Approved By:			
Title: EPA Project Manager	**Date:** 3/18/20		
Approved By:		**Tetra Tech START Project Number:** X903020F0061.000	
Title: EPA Region 7 QA Manager	DIANE HARRIS Digitally signed by DIANE HARRIS Date: 2020.03.20 08:50:59 -05'00'		

approved w/condition

1.0 Project Management:

1.1 Distribution List:

EPA—Region 7: Manuel Schmaedick, EPA Project Manager
Diane Harris, Region 7 QA Manager

Tetra Tech START: (b) (4) Project Manager
Kathy Homer, QA Manager

1.2 Project/Task Organization:

Manuel Schmaedick of the EPA Region 7 Superfund Division will serve as EPA Project Manager for the activities described in this Quality Assurance Project Plan (QAPP). (b) (4) of Tetra Tech, Inc. (Tetra Tech) will serve as the START Project Manager.

1.3 Problem Definition/Background:

Description: This site-specific QAPP form is prepared as an addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment (TBA) Programs (updated October 2017), and specifies site-specific data quality objectives for the sampling activities described herein.

☒ Description attached
☐ Description in referenced report: _____ _____
Title Date

1.4 Project/Task Description:

☐ Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment (PA)
☐ CERCLA Site Investigation (SI) ☐ Brownfields Assessment ☐ Removal Action
☐ Pre-Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Site Screening ☒ Removal Site Evaluation
☐ Other (description attached):

Other Description:

Schedule: Field activities are anticipated to begin in spring 2020.

☐ Description in referenced report: _____ _____
Title Date

1.5 Quality Objectives and Criteria for Measurement Data:

a. Accuracy:	☒ Identified in attached table.
b. Precision:	☒ Identified in attached table.
c. Representativeness:	☒ Identified in attached table.
d. Completeness*:	☒ Identified in attached table.
e. Comparability:	☒ Identified in attached table.

Other Description:

*A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, EPA may still be able to make site decisions based on any or all of the remaining validated data. No critical samples have been identified.

1.6 Special Training/Certification Requirements:

☒ Occupational Safety and Health Administration (OSHA) 1910
☒ Special Equipment/Instrument Operator (describe below): Experienced Geoprobe operator; sampling personnel will also be experienced in collection of environmental samples (sub-slab soil gas, indoor air, ambient air, groundwater, soil).
☐ Other (describe below):

1.7 Documentation and Records:

☒ Field Sheets ☒ Site Log ☒ Trip Report ☒ Site Maps ☐ Video
☒ Chain of Custody ☒ Health and Safety Plan ☒ Letter Report ☒ Photos

☒ Sample documentation will follow EPA Region 7 Standard Operating Procedure (SOP) 2420.05.
☒ A copy of this QAPP and any future amendments will be available to all personnel throughout sampling activities. EPA will maintain original documents.
☒ Other: Analytical information will be handled according to procedures identified in Table 2.

2.0 Measurement and Data Acquisition:

2.1 Sampling Process Design:

☐ Random Sampling ☐ Transect Sampling ☒ Biased/Judgmental Sampling ☐ Stratified Random Sampling
☐ Search Sampling ☐ Systematic Grid ☐ Systematic Random Sampling ☒ Definitive Sampling
☐ Screening w/o Definitive Confirmation ☐ Screening w/ Definitive Confirmation ☐ Incremental Sampling Methodology
☒ Sample Map Attached

☒ Other (Provide rationale behind each sample): See Appendix A for additional sampling information.

The proposed sampling scheme for this project will incorporate a combination of field screening with definitive laboratory analysis, and biased/judgmental sampling for definitive laboratory analysis, in accordance with procedures included in the *Superfund Removal Procedures/The Removal Response Decision: Site Discovery to Response Decision*, Office of Solid Waste and Emergency Response (OSWER) Directive #9360.3-08, June 1998. Judgmental sampling is subjective (biased) selection of sampling locations based on historical information, visual inspection, and best professional judgment of samplers. Samples of exterior soil gas, sub-slab soil gas, indoor air, soil, groundwater, and ambient air will be collected for definitive laboratory analysis at select locations. See Appendices A and B for additional site-specific information and maps. The proposed number of samples was determined by EPA and represents a reasonable attempt to meet study objectives while staying within the budget constraints of a typical site investigation.

Sample Summary Location	Matrix	# of Samples*	Analysis
Commercial and residential structures	Sub-slab soil gas	Up to 20 per event, up to four events	EPA laboratory analysis for tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethane (DCA), 1,1-dichloroethene (DCE), 1,1,1-trichloroethane (TCA), and vinyl chloride (VC)
	Indoor air	Up to 20 per event, up to four events	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC
Upwind locations	Ambient air	One per event, up to four events	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC
On-site soil gas sample locations	Exterior soil gas	Up to 30 per event, up to four events	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC (via EPA Region 7's mobile laboratory)
On-site groundwater sample locations	Groundwater	Up to 30 per event, up to two events	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC
Exterior sub-surface soil sample locations surrounding site.	Soil	Up to 50 per event, up to two events	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC

* Quality control (QC) samples are not included with this total. See Table 1 for a complete sample summary.

2.2 Sample Methods Requirements:

Matrix	Sampling Method	EPA SOP(s) or other Method
Sub-slab soil gas	Sub-slab soil gas samples will be collected by drilling through foundation slabs, installing sub-slab ports, and drawing sub-slab vapors into evacuated stainless steel Summa® canisters. Evacuated Summa canisters will be fitted with 8-hour or 24-hour calibrated flow controllers.	SOPs 2318.07 & 2318.10; Scientific, Engineering, Response & Analytical Services (SERAS) SOP 2082
Indoor and ambient air	Evacuated stainless steel Summa canisters fixed with 8-hour or 24-hour calibrated flow regulators will be used to collect commercial or residential indoor air and ambient air samples.	SOPs 2313.04 & 4231.1704
Exterior soil gas	A 0.5-inch-diameter steel tube will be driven to shallow depth by use of a demolition hammer, and soil gas samples will be collected through the tube and into Tedlar bags enclosed in a vacuum chamber.	SOP 2318.10
Groundwater	Groundwater samples will be collected near the top of the aquifer by use of a direct-push technology (DPT) rig. A 4-foot-long, disposable, polyvinyl chloride (PVC) or stainless steel slotted screen encased in an outer sleeve will be pushed to the desired sampling depth. This sleeve surrounding the screen then will be pulled up to expose the screen and to allow formation water to enter the screen and pipe string. Polyethylene tubing will then be inserted into the pipe string, and a groundwater sample will be retrieved by use of a peristaltic pump or check valve placed at the base of the tubing. Groundwater samples will be transferred directly into laboratory-prepared sample containers.	SOP 4230.07 & SOP 4231.2007
Soil	Sub-surface soil samples will be collected by use of a DPT rig. Each borehole will be advanced by use of a 4-foot-long macro-core sampler fitted with a disposable PVC liner. The PVC liner will be cut open and visually inspected before collection of sections of the soil core into plastic bags. Soil samples will be homogenized in the plastic bags and then distributed into appropriated sample containers.	SOP 4230.07 & SOP 4231.2012

2.3 Sample Handling and Custody Requirements:

☒ Samples will be packaged and preserved in accordance with procedures described in Region 7 EPA SOP 2420.06. If shipment of samples by commercial service is required, each cooler lid will be securely taped shut, and two custody seals will be signed, dated, and placed across the lid opening. Samples will be submitted to the laboratory in a time-efficient manner to ensure no exceedances of applicable holding times.
☒ Chain of custody (COC) will be maintained as directed by Region 7 EPA SOP 2420.04.
☐ COC will be maintained as directed by Tetra Tech SOP 019 (Revision 7), Packaging and Shipping Samples, as well as any additional contract requirements.
☒ The EPA Region 7 laboratory will accept samples according to Region 7 EPA SOP 2420.01.
☐ Other (Describe):

2.4 Analytical Methods Requirements:

☒ Identified in attached table.
☒ Rationale: The requested analyses have been selected based on historical information about the site and program experience with similar types of sites.
☐ Other (Describe):

2.5 Quality Control Requirements

☐ Not Applicable
☒ Identified in attached table.
☒ In accordance with the Generic QAPP for the Superfund Site Assessment and TBA Programs (October 2017).
☒ Field quality control (QC) Samples: For this investigation, field QC samples will include one field blank and one equipment rinsate blank. The field blank will be collected to evaluate contamination of sampling containers and/or preservatives, and to assess contamination potentially introduced during sampling and laboratory procedure(s). The equipment rinsate blank will evaluate effectiveness of decontamination procedures for DPT sampling equipment. Also, one water trip blank per sampling event will be prepared by the EPA Region 7 laboratory to determine whether contamination will have been introduced during transportation of the containers/samples. Duplicate soil and groundwater samples will be collected at a rate of 1 per 20 to assess precision of sampling and laboratory analysis.
☐ Other (Describe):

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements:

☐ Not Applicable
☒ In accordance with the Generic QAPP for Superfund Site Assessment and TBA Programs (updated October 2017).
☒ Testing, inspection, and maintenance of field instruments (photoionization detector [PID] device, handheld global positioning system [GPS] device, gas chromatograph/mass spectrometer [GC/MS] in mobile lab, etc.) will comply with manufacturers' recommendations. Testing, inspection, and maintenance of analytical instrumentation will accord with the previously referenced SOPs and/or manufacturers' recommendations.

2.7 Instrument Calibration and Frequency:

☐ Not Applicable
☒ In accordance with the Generic QAPP for Superfund Site Assessment and TBA Programs (updated October 2017).
☒ Calibration of laboratory equipment will proceed as described in the previously referenced SOPs and/or manufacturers' recommendations.
☒ Other (Describe): Calibration checks of field instruments will occur as specified in the manufacturers' recommendations.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables:

☐ Not Applicable
☒ In accordance with the Generic QAPP for Superfund Site Assessment and TBA Programs (updated October 2017).
☒ All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. The manufacturer will provide sample containers with Level II certifications in accordance with pre-cleaning criteria established by EPA in *Specifications and Guidelines for Obtaining Contaminant-Free Containers*.
☐ Other (Describe):

2.9 Data Acquisition Requirements:

☐ Not Applicable
☒ In accordance with the Generic QAPP for Superfund Site Assessment and TBA Programs (updated October 2017).
☒ EPA and/or its contractor(s) have compiled from other sources data or information pertaining to the site (including other analytical data, reports, photos, maps, etc., that are referenced in this QAPP). Some of those data have not been verified by EPA and/or its contractor(s); however, EPA will not use that unverified information for decision-making purposes without verification by an independent professional qualified to verify such data or information.
☐ Other (Describe):

2.10 Data Management:

☒ The EPA Region 7 laboratory will manage all data acquired there in accordance with Region 7 EPA SOP 2410.01.
☒ Other (Describe): The START-subcontracted laboratory will manage all data acquired there in accordance with the laboratory's established procedures.
☒ All data will be managed in accordance with the site-specific data management plan in Appendix C to this document.

3.0 Assessment and Oversight:

3.1 Assessment and Response Actions:

☒ Peer Review ☒ Management Review ☐ Field Audit ☐ Lab Audit
☒ Assessment and response actions pertaining to analytical phases of the project associated with the EPA Region 7 laboratory are addressed in Region 7 EPA SOPs 2430.06 and 2430.12.
☐ Other (Describe):

3.1A Corrective Action:

☒ Corrective actions will be at the discretion of the EPA Project Manager whenever problems appear that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the site.
☐ Other (Describe):

3.2 Reports to Management:

☐ Audit Report ☐ Data Validation Report ☐ Project Status Report ☐ None Required
☒ START will prepare and submit to EPA a letter report describing sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results.
☒ Preparation of reports will accord with the Generic QAPP for Superfund Site Assessment and TBA Programs (updated October 2017).
☐ Other (Describe):

4.0 Data Validation and Usability:

4.1 Data Review, Validation, and Verification Requirements:

☐ Identified in attached table.
☒ Data review and verification will accord with the Generic QAPP for Superfund Site Assessment and TBA Programs (updated October 2017).
☒ A qualified analyst and the EPA Region 7 laboratory's Section Manager will conduct data review and verification of analytical results generated by that laboratory, as described in Region 7 EPA SOPs 2430.12 and 2410.10.
☒ Other (Describe): Data from a START-contracted laboratory (if required) will be validated by application of methods consistent with a Stage 2A validation, as described in the EPA Contract Laboratory Program (CLP) *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), at the frequency specified in that guidance document. A Stage 2A validation includes verification and validation based on a completeness and compliance check of sample receipt conditions and sample-related QC results. The EPA Project Manager will be responsible for overall validation and final approval of the data, in accordance with the projected use of the results.

4.2 Validation and Verification Methods:

☐ Identified in attached table.
☒ Validation of data generated by the EPA Region 7 laboratory will accord with Region 7 EPA SOPs 2430.12 and 2410.10.
☒ The EPA Project Manager will inspect the data to provide a final review. The EPA Project Manager will review the data, if applicable, for laboratory spikes and duplicates, laboratory blanks, and field duplicates to ensure the data are acceptable. The EPA Project Manager will also compare the sample descriptions with field sheets for consistency, and will ensure appropriate documentation of any anomalies in the data.
☒ Other (Describe): If any problems with field measurements or analytical data are identified by data verification/validation, the EPA Project Manager will be informed to explain circumstances of the problem, describe any corrective action taken, and provide an opinion on limitations and usefulness of the data.

4.3 Reconciliation with User Requirements:

☐ Identified in attached table.
☒ If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded, and re-sampling or re-analysis of the subject samples may be required by the EPA Project Manager.
☐ Other (Describe):

Region 7 Superfund Program
Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Activities (October 2017)
for the Martha Rose Chemical Site

Table 1: Sample Summary

Site Name: Martha Rose Chemical		**Location:** Holden, Missouri	
START Project Manager: John Simpson		**Activity/ASR #:** TBD	**Date:** February 2020

No. of Samples	Matrix	Location	Purpose	Depth or Other Descriptor	Requested Analysis	Sampling Method	Analytical Method/SOP
Up to 20 per event, up to four events	Sub-slab soil gas	Commercial and residential buildings on site	To assess potential impact on human health from site contaminants through vapor intrusion	0-6 inches below foundations/basement floors of structures	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	EPA SOPs 2318.07 & 2318.10; SERAS SOP 2082	EPA Method TO-15
Up to 20 per event, up to four events	Indoor air	Commercial and residential buildings on site	To assess impact on human health from site contaminants through vapor intrusion	Not applicable (NA)	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	EPA SOPs 2313.04 & 4231.1704	EPA Method TO-15
One per event, up to four events	Ambient air	Upwind of buildings sampled for vapor intrusion assessment	To assess VOCs in ambient air that could contribute to indoor air results	NA	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	EPA SOPs 2313.04 & 4231.1704	EPA Method TO-15
Up to 30 per event, up to four events	Exterior soil gas	On-site soil gas locations	To identify extent of contamination in soil gas	Within the vadose zone	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC (analyzed with portable GC/MS)	EPA SOP 2318.10	EPA Method TO-15
Up to 30 per event, up to two events	Groundwater	On-site Geoprobe borings	To identify extent of contamination in groundwater	Directly below groundwater table	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	EPA SOPs 4230.07 and 4231.2007	EPA SOP 3230.13
Up to 50 per event, up to two events	Soil	On-site Geoprobe borings	To assess VOCs in soils that could impact local groundwater	0-40 feet below ground surface (bgs)	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	EPA SOPs 4230.07 and 4231.2012, and EPA Method 5035	EPA SOP 3230.16
QC SAMPLES							
Up to three (one per 20)	Water	Duplicate	To assess precision of analytical and sampling methods	NA	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	NA	EPA SOP 3230.13
Up to five (one per 20)	Soil	Duplicate	To assess precision of analytical and sampling methods	NA	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	NA	EPA SOP 3230.16
Up to two (one per sampling event)	Water	Equipment rinsate blank	To evaluate effectiveness of decontamination procedures for Geoprobe sampling equipment	NA	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	NA	EPA SOP 3230.13
Up to two (one per sampling event)	Water	Field blank	To assess field/laboratory-related contamination	NA	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	NA	EPA SOP 3230.13
Up to two (one per sampling event)	Water	Trip blank	To assess field/transportation-related contamination	NA	PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	NA	EPA SOP 3230.13

Region 7 Superfund Program Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Activities (October 2017) for the Martha Rose Chemical Site								
Table 2: Data Quality Objective Summary								
Site Name: Martha Rose Chemical				**Location:** Holden, Missouri				
START Project Manager: John Simpson				**Activity/ASR #:** TBD			**Date:** February 2020	
Analysis	**Analytical Method**	**Data Quality Measurements**					**Sample Handling Procedures**	**Data Management Procedures**
		Accuracy	**Precision**	**Representativeness**	**Completeness**	**Comparability**		
Soil								
PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	See Table 1	Per analytical method	Per analytical method	Biased/judgmental sampling based on professional judgement of the sampling team	100%; No specific critical samples have been identified	Standardized procedures for sample collection and analysis will be used	See Section 2.3 of QAPP	See Section 2.10 of QAPP form
Air (includes soil gas, sub-slab vapor, indoor air, and ambient air samples)								
PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	See Table 1	Per analytical method	Per analytical method	Biased/judgmental sampling based on professional judgement of the sampling team	100%; No specific critical samples have been identified	Standardized procedures for sample collection and analysis will be used	See Section 2.3 of QAPP	See Section 2.10 of QAPP form
Groundwater								
PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC	See Table 1	Per analytical method	Per analytical method	Biased/judgmental sampling based on professional judgement of the sampling team	100%; No specific critical samples have been identified	Standardized procedures for sample collection and analysis will be used	See Section 2.3 of QAPP	See Section 2.10 of QAPP form

APPENDIX A

SITE-SPECIFIC INFORMATION REGARDING INVESTIGATIVE ACTIVITIES AT THE MARTHA ROSE CHEMICAL SITE

INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division, under contract number 68HE0719D0001, Task Order No. 20F0061, tasked the Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) to support a Removal Site Evaluation (RSE) and vapor intrusion assessment of the Martha Rose Chemical site in Holden, Johnson County, Missouri (the site or subject property) (see Appendix B, Figures 1 and 2). Historically, the 26-acre and currently vacant subject property—now owned by the City of Holden—had hosted a polychlorinated biphenyl (PCB) processing facility that operated under the name Martha C. Rose Chemical, Inc. (Rose Chemical). No permanent structures are currently present on the subject property.

This RSE will focus primarily on the vapor intrusion pathway near and downgradient of the Rose Chemical property. Field activities will include sub-slab vapor, indoor air, ambient air, and exterior soil gas sampling during as many as four events. Collection and analyses of soil and groundwater samples also will occur to aid identification of immediate threats to human health and the environment.

This Quality Assurance Project Plan (QAPP) identifies site-specific features and addresses elements of the sampling strategy and analytical methods proposed for the investigation.

SITE BACKGROUND INFORMATION

Information regarding the site's location, description, background, and relevant investigation history is discussed in this section.

Site Location/Description

The site is in the West area of Holden, Johnson County, Missouri (see Appendix B, Figures 1 and 2). The site is included on the Holden, Missouri U.S. Geological Survey (USGS) 7.5 minute topographic series maps (USGS 1980). Coordinates at the approximate center of the site are 38.720042 degrees north latitude and 93.996251 degrees west longitude. The site is bounded north by a railroad line, with residential properties and undeveloped land beyond; east by a city maintenance facility and mixed residential and commercial properties; south by Highway 58, with mixed residential and commercial property beyond; and west by undeveloped land and residential properties. The City of Holden Wastewater Treatment Facility is west of the site.

No permanent structures or features are present on the approximately 26-acre site, which is currently undeveloped, vacant land. Historically, the site hosted a PCB processing facility (Rose Chemical).

Geology and Hydrogeology

Johnson County is within the Dissected Till Plains of the Central Lowlands physiographic province of Missouri. The geologic stratigraphy of the site area consists of interbedded limestones and shales of the Mississippian System Chouteau Group. Dominant soil in the site vicinity consists of Sampsel and Haig series soils (U.S. Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS] 2017). Sampsel and Haig soils are somewhat poorly drained silty clay loams.

The site lies within the West-Central Missouri groundwater province. The West-Central Missouri groundwater province is northwest of the Salem Plateau. The boundary between the two is a freshwater-saline water transition zone. South and west of the transition zone, groundwater in the Springfield Plateau (Ozark and St. Francois aquifers) is of good chemical quality. North and west of the transition zone, these same aquifers yield highly mineralized water that is poor for domestic use. Potable groundwater is difficult to obtain in the region. Shallow Pennsylvanian-aged limestone and sandstone produce low-yielding, marginal-quality water (Missouri Department of Natural Resources [MDNR] 2014).

Runoff from the site is believed to permeate to subsurface soil or follows surface topography to the north-northwest toward East Pin Oak Creek.

Two borings were advanced on the subject property as part of a previously conducted geotechnical exploration. These borings identified lean to fat clays between the surface and 5 feet below ground surface (ft bgs). Stiff clays with silts, sands, and gravels (at deeper intervals) were present between 5 and 13-19 ft bgs. Weathered olive gray shales were present at greater depth. The deepest boring was terminated at 19.5 ft bgs (Olsson and Associates [Olsson] 2014).

PREVIOUS INVESTIGATIONS

Rose Chemical Remedial Action

Rose Chemical began operating as a PCB processing facility at the site in 1982. Chemical processing of PCB material occurred at the site until early 1986. During that time, Rose Chemical processed approximately 23 million pounds of PCB-containing material. Approximately 14-16 million pounds of material was abandoned on site. In late 1986, EPA Region 7 issued an Administrative Order on Consent (AOC) to the Rose Chemicals Steering Committee (RCSC). RCSC was responsible for containerizing and securing PCB material and completing a waste inventory at the site. A second AOC was issued 1 week following the first, ordering the RCSC to remove containerized, PCB-containing material from the site and to complete a Remedial Investigation/Feasibility Study (RI/FS). Following the consent orders,

the containerized PCB waste was transported to a permitted chemical waste landfill off site. The completed RI/FS identified PCBs in surface and subsurface soils, pond sediments, and sediments in East Pin Oak Creek. Based on results of the RI/FS, EPA issued a Record of Decision (ROD) in 1992 that outlined the following remedial actions to be taken:

- Removal from East Pin Oak Creek and off-site disposal of sediment containing PCB concentrations at or exceeding 0.18 milligrams per kilogram (mg/kg)
- Excavation, removal, and off-site disposal of soil containing PCB concentrations exceeding 10 mg/kg
- Dismantlement and off-site disposal/treatment of facility buildings
- Backfilling of excavated areas with clean soil
- Monitoring of subject property groundwater
- Restriction of the subject property title to prohibit groundwater use
- Treatment of any other contaminated material.

EPA issued a third AOC in 1992 directing RCSC to develop a Remedial Design (RD) and to implement the RD by conducting a Remedial Action (RA). Activities completed during the RA included excavation, removal, and backfill of approximately 31,500 tons of contaminated soil, as well as installation of monitoring wells to monitor groundwater contamination levels. RA activities were completed in mid-1995. Groundwater monitoring at the site continued until mid-1999. A deed restriction was filed pertaining to the subject property, restricting drilling and/or installation of groundwater wells (EPA 1992).

Seagull Environmental Technologies, Inc. (Seagull) 2016 Phase I Environmental Site Assessment (ESA)

In 2016, the MDNR – Brownfields/Voluntary Cleanup Program (BVCP) tasked Seagull to perform a Phase I ESA of the subject property. The assessment identified three recognized environmental conditions (REC) and two historical RECs (HREC) to the subject property. HRECs pertaining to the Rose Chemical operations are discussed above. RECs included stained soil and gravel observed on the adjoining City of Holden Street Department facility, and former presence of an upgradient historical drycleaning facility and metal polishing facility. The ESA recommended a Phase II ESA to confirm or eliminate those RECs (Seagull 2016).

Tetra Tech 2018-2019 Phase II Targeted Brownfields Assessment (TBA)

In late 2018 and early 2019, Tetra Tech conducted a Phase II TBA for the EPA Brownfields program to determine if historical activities at the site and surrounding properties had impacted soils and groundwater. The assessment included advancement of 21 soil borings via direct-push technology (DPT). A total of 41 soil samples collected included samples from both the surface and subsurface. Laboratory analysis of those samples indicated levels of arsenic in both surface and subsurface soils exceeding the EPA Regional Screening Level (RSL) for industrial soil of 3 mg/kg. Metals are naturally occurring in soils, and the arsenic concentrations in these soil samples were not significantly different from background arsenic levels within Johnson County. Notably, the Phase II TBA identified concentrations of trichloroethene (TCE) in shallow groundwater exceeding EPA's Vapor Intrusion Screening Levels (VISL) for shallow groundwater (Tetra Tech 2019). A review of historical records pertaining to the site indicated that the VOC concentrations detected appeared to be localized, residual impacts of the former Rose Chemical facility (EPA 1992).

SAMPLING STRATEGY AND METHODOLOGY

In support of EPA Region 7, under this task order, Tetra Tech START will conduct an RSE with focus on downgradient vapor intrusion. Expectation is that the vapor intrusion assessment will involve as many as four sampling events to occur seasonally. Initial sampling activities are tentatively scheduled for March/April 2020, and are expected to require approximately 1 week per event. Anticipation is that two Tetra Tech START members will be required for the activities described in this QAPP. As applicable, standard operating procedures (SOP) and chain-of-custody (COC) procedures referenced in the QAPP will be followed throughout sampling activities to verify integrity of samples from time of collection until submittal to the laboratory for analysis. Laboratory data obtained from all samples collected during this project will be compared to EPA Region 7 screening levels for soil gas and sub-slab vapor to assess whether further assessment is warranted. Data will be managed in accordance with the procedures in Section 2.10 of the QAPP addendum and Site-Specific Data Management Plan (see Appendix C).

Sub-Slab Port Installation

Proposed RSE sampling calls for installation of up to 20 sub-slab ports. The exact number of ports installed will depend on how many residences within the targeted area grant access to EPA, and sizes of those buildings. Exact port locations at each residential building will be identified by field personnel; however, in general, an attempt will be made to locate ports centrally (with respect to the buildings' footprint) in concrete slabs while avoiding buried utilities.

The concrete floor at each sub-slab sampling location will be penetrated by a hammer drill with a 1.5-inch-diameter concrete bit to depth of about 1.5 inches into the slab. A 0.75-inch-diameter hole will then be drilled through the center of the larger inset, penetrating the slab. An approximately 4-inch-long, 0.25-inch-diameter stainless steel port will be inserted through the drill hole into the sub-slab material. A 0.25-inch National Pipe Thread (NPT) fitting attached to the top of the port with a removable plug will allow it to be sampled and then resealed. Quick-setting hydraulic cement will be used to seal the sampling port in the drill hole. A cork surrounding the bottom portion of the probe will prevent grout from falling into the hole. The port will be flush with the floor and left in place until the project is complete. Construction and installation procedures will accord with Scientific Engineering Response and Analytical Services (SERAS) SOP 2082 and EPA SOP 2318.07.

A helium test will be conducted to verify that the port is properly sealed after the sub-slab port is installed and the grout has hardened. A 1-liter Tedlar bag will be placed into a vacuum chamber (Pelican case), which will be connected to the port by use of 0.25-inch-diameter perfluoroalkoxy (PFA) tubing. A plastic enclosure will be placed over the port, a helium tank will be attached to a fitting on the enclosure by use of plastic tubing, and the tank will be opened to allow helium to flow into the enclosure. Concurrently, sub-slab vapors will be purged from the sample line and sub-slab area, requiring operation of a sampling pump at a flow rate of 200 milliliters per minute (mL/min) until the Tedlar bag is full. The Tedlar bag will then be removed from the vacuum chamber and connected to a helium detector. If a helium reading greater than 5 percent above background is observed, corrective measures will be taken to address leaks in the system. If helium readings less than 5 percent above background cannot be achieved, the port must be abandoned and a new hole drilled. If no helium readings greater than 5 percent above background have been observed, the system will be considered free of leaks and ready for sampling. Helium leak check results will be recorded in the field logbook. Helium leak check procedures will accord with EPA SOP 2318.07.

Sub-Slab Vapor Sampling

Sub-slab vapor samples will be collected through installed ports at up to 20 commercial and/or residential locations. Before samples are collected, a leak check will be completed at each port as previously described.

At each location, about 6 inches of disposable, 0.25-inch-diameter PFA tubing will be used to connect the top of the port to an evacuated Summa canister to collect a sub-slab vapor sample for analysis. Before the

sample is collected, the tubing will be connected to a small vacuum pump to purge ambient air from the tubing, port, and immediate sub-slab area.

Sub-slab vapor samples will be collected over 8-hour periods at commercial properties and over 24-hour periods at residential properties via flow regulators attached to the Summa canisters. Pertinent data—including analyses to be performed, exact sample locations, canister numbers, and start/stop times and vacuum readings—will be recorded for each sample. Sub-slab sampling will accord with procedures in EPA Region 7 SOPs 2318.07, 2318.10, and Scientific, Engineering, Response & Analytical Services (SERAS) SOP 2082. Sub-slab vapor samples will be analyzed for tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethane (DCA), 1,1-dichloroethene (DCE), 1,1,1-trichloroethane (TCA), and vinyl chloride (VC) at the EPA Region 7 laboratory according to EPA Method Toxic Organics (TO)-15. Up to four rounds of sampling are anticipated to detect any seasonal variability among concentrations.

Indoor Air and Ambient Air Sampling

Indoor air samples will be collected within basement areas in the up to 20 commercial and/or residential properties selected for sampling. Evacuated Summa canisters fitted with 24-hour passive flow regulators will be located within living areas at residential properties, or will be fitted with 8-hour passive flow regulators for sampling at active business spaces. Indoor air sampling will accord with EPA Region 7 SOP 4231.1704. In addition to indoor air samples, one sample will be collected at an outdoor location (ambient air). The ambient air sample location will be identified by field personnel while on site, but will generally be upwind of sampled buildings. The ambient air sample will also be collected over a 24-hour period. Pertinent data—including analyses to be performed, exact sample locations, canister numbers, and start/stop times and vacuum readings—will be recorded for each sample. Indoor air and ambient air samples will be analyzed for PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC at the EPA Region 7 laboratory according to EPA Method TO-15. Up to four rounds of sampling are anticipated to detect any seasonal variability among concentrations.

Before indoor air sampling, the structures will be inspected for stored chemicals and fuels that may contribute VOCs to indoor air. These items will be inventoried and either sealed in plastic bags or removed from the premises several days before sampling to minimize introduction of VOCs from other sources (other than from a subsurface source).

Soil Gas Sampling

Tetra Tech proposes to collect up to 30 soil gas samples in selected locations across the site. A 0.5-inch-diameter steel tube with an expendable point will be driven to 5-7 feet bgs by use of a demolition hammer. The probe then will be retracted about 3 inches, releasing the expendable point and opening a void below the tube. At least two volumes of soil gas will be purged from the steel tube by use of a vacuum pump. When the vacuum in the tube has returned to atmospheric pressure, a vacuum chamber (Pelican case) containing a 1-liter Tedlar bag will be connected to the top of the steel tube with plastic tubing, and a soil gas sample will be drawn into the Tedlar bag by use of a vacuum pump. The collection will be performed at a flow rate less than or equal to 200 mL/min to ensure that the vacuum is not high enough to draw ambient air into the steel tube. Soil gas samples will be analyzed for PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC by EPA Region 7's mobile laboratory via EPA Method TO-15. Up to four rounds of soil-gas sampling are anticipated.

Soil Sampling

As many as 50 soil borings are proposed to collect soil samples at the site. The locations of these proposed soil borings are yet to be determined. At each boring location, START will use a DPT rig to advance a boring containing disposable PVC liners to maximum depth of 40 ft bgs, to geologic refusal, or to the groundwater table, whichever occurs first.

One soil sample will be collected from each boring (total of 50 soil samples) and submitted for laboratory analysis. Soil cores will be screened by use of a hand-held photoionization detector (PID) for presence of elevated concentrations of VOCs. One soil sample will be collected within the depth interval inducing the highest PID reading. If no elevated readings are observed, collection will occur within intervals where visual impacts appear or odors are detected. If no indications of contamination are found, soil samples will be collected within depth intervals selected by EPA or the START field team that could include the capillary fringe (if groundwater is encountered) or the bottom of boring.

Within each sample interval, a grab sample for PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC analyses will be collected in accordance with EPA SW-846 Method 5035. Samples to be submitted to the EPA Region 7 laboratory will each consist of two 40-mL vials preserved with sodium bisulfate and containing approximately 5 grams of soil, one 40-mL vial preserved with methanol and containing approximately 5 grams of soil, and one unpreserved 40-mL vial (or other appropriate container) packed with soil for determination of moisture content. Up to two rounds of soil sampling are anticipated.

Groundwater Sampling

Tetra Tech proposes to advance DPT temporary wells for groundwater sampling at as many as 30 locations.

Locations of the proposed groundwater samples are yet to be determined. Each DPT temporary well will be collocated with a DPT soil boring. START will collect groundwater samples near the water table at each DPT temporary well. Expected depth to groundwater is between 5 and 15 ft bgs. If boring refusal occurs without encountering groundwater, no groundwater sample will be collected.

Samples from temporary wells will be collected by use of a Geoprobe® Screen Point 16 sampling apparatus containing either a disposable, 4-foot-long PVC screen or a Geoprobe reusable, stainless-steel screen. At each location, the sampler will be advanced to approximately 4-5 feet below the water table, and then the screen will be exposed to the aquifer. After the screen is deployed at the bottom of the boring, about 1 gallon of water will be purged through disposable polyethylene tubing by use of a check valve placed at the bottom of the tubing.

Samples to be submitted to the EPA Region 7 laboratory for analyses for PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC will be collected in three 40-mL vials, each preserved with hydrochloric acid (HCl) to a pH <2.

After sampling at each location, the groundwater sampler and rods will be decontaminated with a tap water and Alconox wash, followed by a tap water rinse, before sampling occurs at the next location. New tubing will be used at each well location. Up to two rounds of groundwater sampling are anticipated.

General Sampling Information

After collection, each sample will be labeled and packaged accordingly, and placed in a cooler maintained at or below a temperature of 4 degrees Celsius (°C) from time of collection until submittal to the EPA Region 7 laboratory for analysis.

After completion of sampling, all boreholes will be plugged with bentonite from bottoms of the holes to ground surface. Any disturbance to surface pavements will be patched with similar material.

QUALITY CONTROL (QC) SAMPLES

To evaluate QC, one field blank, one equipment rinsate blank, and a trip blank will be collected per soil and groundwater sampling event, as specified in Section 2.5 of the QAPP form. The blank samples will be submitted for analyses for PCE, TCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, and VC.

Results from the field blank will be used to evaluate contamination of sampling containers and/or preservatives, and to assess contamination potentially introduced during sampling and laboratory procedure(s). Results from the equipment rinsate blank will be used to evaluate decontamination procedures applied to non-disposable sampling equipment. The rinsate sample will be prepared by running DI water through the Screen Point 16 sampler immediately following decontamination of the sampler, and allowing the water to flow into preserved sample containers.

A water trip blank will accompany samples to assess whether contamination will have been introduced during field activities and transportation.

Field QC samples for this investigation will also include one ambient air sample per air sampling event. No field duplicates of air samples will be collected because evaluation for total method precision will not be necessary for this project.

To assess general laboratory precision, duplicate samples of soil and groundwater samples will be at a rate of 1 per 20. Duplicate samples will undergo the same analyses as the counterpart field samples. Relative percent differences (RPD) between results from field and duplicate samples will be calculated if analyte concentrations in both samples are detected above reporting limits. Generally, an RPD of less than 20% is an acceptable level of precision. Analytes with RPDs exceeding 20% will be flagged and communicated to EPA for discussion whether additional measures should be taken.

A summary of all anticipated samples for this project is in Table 1. A summary of data quality objectives for this project is in Table 2. SOPs and chain-of-custody procedures referenced in the original QAPP and this QAPP Addendum will be followed throughout sampling activities to verify integrity of samples from time of collection until submittal to the laboratory for analysis.

ANALYTICAL METHODS

Sub-slab vapor, indoor air, ambient air, soil, and groundwater samples will be submitted to the EPA Region 7 laboratory in Kansas City, Kansas. Exterior soil gas samples will be analyzed by EPA Region 7's mobile laboratory. Samples will be analyzed according to SOPs and methods referenced on the QAPP form. Standard turnaround times and detection limits for those methods will be adequate for this project. If during the course of the project, the EPA Project Manager determines that an expedited turnaround is necessary, some samples may be submitted to a START-contracted laboratory for analysis. Appropriate containers and physical/chemical preservation techniques will be applied during field activities to help verify acquisition of representative analytical results.

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U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). 2017. Johnson County, Missouri. Accessed on July 11, 2018. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

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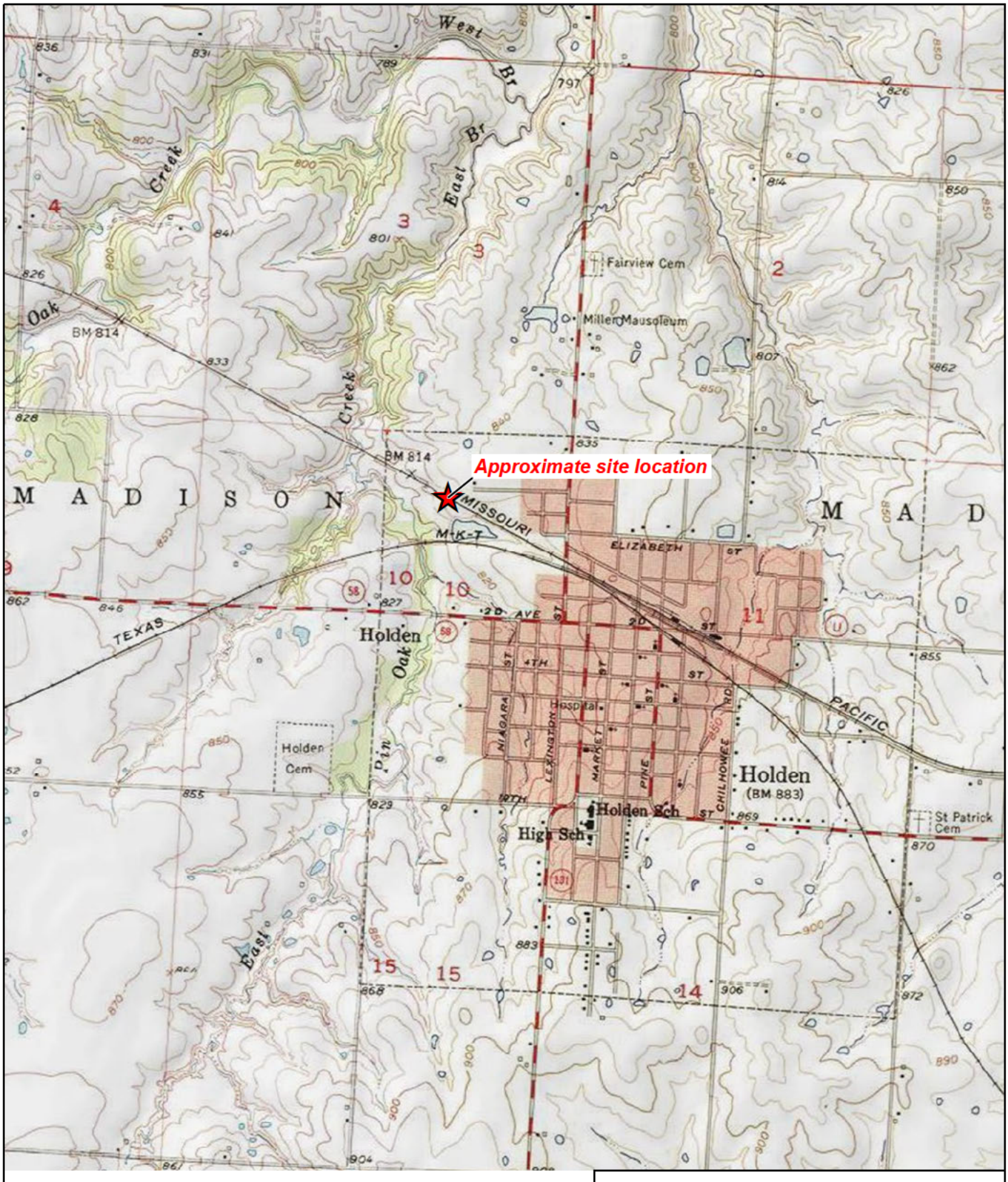
APPENDIX B

FIGURES



N

0 1,000 2,000

Feet

Source: USGS Holden, MO 7.5 Minute Topo Quad, 1959; USGS Kingsville, MO 7.5 Minute Topo Quad, 1959

Martha Rose Chemical Site
Holden, Missouri

Figure 1
Site Location Map

TETRA TECH

Date: 2/14/2020 Drawn By: Rose Micke Project No: X903020F0061

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East Pin Oak Creek
Union Pacific Railroad
Missouri-Kansas-Texas Railroad Former Spur
Storage Trailers
Recycling Building
Secondary Containment with ASTs, Drums, 5-gallon Containers
Shed
Stormwater Retention Ponds
Main Building
Drainage Ditch
Spill Containment Pond
South Warehouse
Fastop Convenience Site
Grand Avenue
W Nay Street
W Walnut Street
N Olive Street
N Mary Street
Maple Street
W Elizabeth Street
W Madison Street
N Main Street
N Buffalo Street
W McKissock Street
N Lexington Street
S Olive Street
S Market Street
S Main Street
W 2nd Street
St. Charles Street
Niagara Street
S Buffalo Street
58
131

Legend

- Former monitoring well location
- Proposed soil gas sample location
- Proposed indoor air/sub-slab sample location
- Creek
- Existing railroad
- Former railroad spur
- Approximate subject property boundary
- Former structure
- Former surface water feature

AST Aboveground storage tank

Note: Locations of former features are approximate and derived from the sourced georeferenced figure. Location of East Pin Oak Creek is estimated from aerial imagery.

N

0 125 250

Feet

Source: NAIP, 2016; U.S. Environmental Protection Agency (EPA), Record of Decision, Martha C. Rose Chemicals Site, Holden, Missouri, Figure 2 - Site Layout, 1992; ESRI, ArcGIS Online, World Imagery, 2018.

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Martha Rose Chemical Site
Holden, Missouri

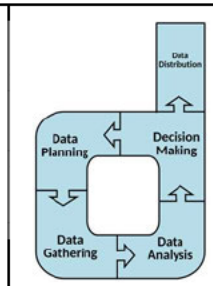
Figure 2
Proposed Sample Location Map

TETRA TECH

Date: 2/18/2020 Drawn By: Rose Micke Project No: X903020F0061.000

APPENDIX C

SITE-SPECIFIC DATA MANAGEMENT PLAN



EPA Site-Specific Data Management Plan			
Site Name:	Martha Rose Chemical Site	**Site ID:**	078D
Author:	(b) (4)	**Affiliation:**	Tetra Tech (START)
Date Initiated:	2/17/20	**Last Updated:**	

This site-specific data management plan (SSDMP) is intended to provide guidance for data collection, storage, analysis and distribution. The data collection and management practices identified in this plan are designed to ensure data integrity and consistency throughout the project. The SSDMP should be used in conjunction with the Region 7 Regional Data Management Plan. The SSDMP is not intended to be all encompassing regarding data management. Additionally, this document is intended to be updated as data management practices change; therefore, revisions of this plan are expected during a project.

Data Planning

Data Quality Objective	Data Stream(s)
Determine if hazardous substances are present at levels that pose a threat to human health and the environment	Sampling Data
Assess migration exposure pathways for removal/further site evaluation	Documents/Files

Data Planning – Site Contact List

Name (Affiliation)	Role	Email	Phone Number
Manuel Schmaedick	On-Scene Coordinator	Schmaedick.Manuel@epa.gov	(913) 551-7449
	Data Manager		
	Public Information Officer		
	Community Involvement Coordinator		
(b) (4)	START Team Contact	(b) (4)	(b) (4)
Nick Wiederholt	GIS Team Contact	Nick.Wiederholt@tetratech.com	(816) 412-1952
	State Agency Contact		
	Local Agency Contact		

Data Gathering - Collection

Data Stream	Collection Tool	Specifications	Instructions	Repository
Images	Camera/Iphone	Photographer, Lat/Long, date, time		Response.EPA.gov
Documents / Files	Mobile Data Form	Form name, User		Response.EPA.gov / SEMS
Contacts	Response.EPA.gov	Name, Affiliation		Response.EPA.gov
Monitoring Data	Mobile Data Form	LocationID		Scribe/Viper
Sampling Data	Mobile Data Form	SampleID, LocationID,		Scribe / SEMS
Analytical Data	Scribe	SampleID, Result, Analyte		Scribe / SEMS
Spatial Data	GIS	Lat/Long	Record coordinates by use of handheld device (EPA R7 SOP 2341.01)	ER Cloud

Data Gathering – Quality Assurance/Quality Control

Data Stream	QA/QC Method	Frequency	Responsibility
Data Collection Instrumentation	Calibration	Per recommended instrumentation requirement (minimum)	OSC/Data Manager/START PM
Images	Technical/Editorial Review	Prior to storage deposit	OSC/Data Manager/START PM
Documents / Files	Technical/Editorial Review	Prior to storage deposit	Data Manager
Contacts	Technical/Editorial Review	Daily	OSC
Monitoring Data	Technical Review	Prior to storage deposit	Data Manager
Sampling Data	Technical Review	Prior to storage deposit	Data Manager
Analytical Data	Data validation review of contract lab data	Prior to storage deposit	START
Analytical Data	Technical Review	Prior to storage deposit	Data Manager
Spatial Data	Technical Review	Prior to storage deposit	GIS Team

Data Gathering - Storage

Repository	Instructions	Frequency	Responsibility	Access Details
Response.EPA.gov	Website to be created by OSC	Create at initiation of project – planning phase	OSC	Website name – created by OSC
Scribe	Scribe project created at direction of OSC and Data Manager	At beginning of project – prior to data collection	Data Manager	Scribe Project #
ER Cloud	Store operational data on the ER Cloud in accordance with EPA requirements	Throughout response	Data Manager	ER Cloud secured access

Data Analysis – Decision Making

Analysis Task	Method	Data Storage Source	Frequency	Responsibility	Deliverable
Sample results evaluation	Web Viewer / Database evaluation	Project geodatabase, Scribe	As directed by OSC	Data Manager / GIS	Map / Interactive Web Viewer

Data Distribution

Deliverable	Audience	Review	Approve	Release Method
Pollution Report / Situation Report	Response partners	Data Manager / OSC	OSC	Email / Response.EPA.gov
Web Viewer	Response partners	Data Manager / OSC	OSC	Geoplatform – Private
Story Map (as needed)	Public	OSC / OPA	OSC / OPA	Geoplatform / Response.EPA.gov - Public